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MINERALS PROGRAM
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September 7, 1990

DIVISION OF
OIL, GAS & MINING

Mr. Ed King
Jumbo Mining Company
6305 Fern Spring Cove
Austin, TX. 78730

RE: Drum Mine Project
Proposed New Heap Leach Pad
Submittal Review

Dear Mr. King:

This letter is in response to your letter dated August 10, 1990, and my review on site with Mr. Hartshorn. We understand that the decision to build the pad has not been made. Although some of the application requirements of the regulations have already been met, we suggest you carefully review the entire regulation, in order to determine the effort and expense that will be necessary in order to receive a construction and ground water permit for a new pad.

The following general observations are offered in order to assist you in this decision:

1. Plans, specifications, and construction certification for the project must be submitted bearing the seal of a registered professional engineer.
2. The process ponds for the facility were built with older construction techniques and materials. Therefore, integrity of the ponds in terms of their ability to contain cyanide bearing solution must be clearly established. They need to be rebuilt.
3. Adequate control measures must be provided to demonstrate that contamination or degradation of ground water will not occur as a result of waste rock and overburden piles.
4. It will be necessary to prepare and receive approval for an operation and maintenance manual, contingency operation and neutralization for the facility, which would include data collection and reporting requirements.

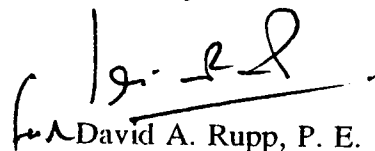
Jumbo Mining
September 7, 1990
Page Two

For detailed design of the heap, it may be worthwhile to visit a few new heap leach sites in the state to better understand these techniques. The cross section drawing submitted has been reviewed as part of the proposed design criteria. We suggest that these criteria be refined, and approved prior to initiating detailed design. The following items are noted:

- I. Above the primary liner, the section shows a protective material of 6-inch depth. The gradation of this material, and depth of this material must be sufficient to designed to prevent penetration damage to the flexible membrane liner (FML).
- II. The slope on the ore heap must be adequately designed to prevent sloughing of the heap, or release of ore or other rock which could damage the FML.
- III. The head monitoring system should not intercept fluids from other locations.
- IV. The height of the diversion berm must be designed to contain the flow depth from regular operation flow and the 100 year rainstorm of 24-hour duration.
- V. The leak diversion berm should be eliminated. We feel it would be too difficult to detect leakage using it. Also, we suggest the leak detection media end at the toe of the solution diversion berm. The leak detection system should include perforated piping installed on the engineered base to a sump pipes or manholes. The sumps should normally be capped closed, except when checking for leakage, they would only be open to inflow from the mentioned perforated leak collection piping.
- VI. You may provide leak collection piping below primary FML, but it is essential to be installed on the engineered base.

Please feel free to call me or Mr. Kiran Bhayani on these issues.

Sincerely,



David A. Rupp, P. E.
Environmental Engineer
Bureau of Water Pollution Control

DAR:rvg
cc: Wayne Hedberg, DOGM

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